Water Street Bridge
Spanning New Haven Division of
Metro-North Commuter Railroad
on U.S. Route 1
New Haven
New Haven County
Connecticut

HAER No. CT-29

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

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HISTORIC AMERICAN ENGINEERING RECORD
WATER STREET BRIDGE

HAER No. CT-29

Location:	City of New Haven, spanning the New Haven Division of the Metro-North Commuter Railroad on U.S. Route 1, New Haven County, Connecticut
UTM Coordinates:	Easting - Zone 18 Coordinate 673800 Northing Coordinate 4574080
7.5'USGS Quadrangle:	New Haven
Dates of Construction:	1894 with major rehabilitation in 1977
Ownership:	Ownership of the bridge changed hands from the Pennsylvania Central Railroad Trustees to the State of Connecticut Department of Transportation when the state bought the rail line it traverses in the Fall of 1985.
Use:	Motor vehicle and very limited pedestrian use, as well as public utility pipe crossings. Presently closed to traffic due to structural inadequacies.
Description:	This bridge (Bridge Number 334) is a single 163 foot span structural steel Baltimore truss superstructure supported on stone masonry abutments. These abutments are carried on concrete footings founded on timber piles. The floorbeams are riveted plate girders suspended from the trusses. The roadway is 36 feet wide. The two sidewalks are 10 feet wide each and lie outside the trusses. A 20 inch water main and a 16 inch high pressure gas line travels along the north sidewalk while a 20 inch low pressure gas line and a handrail travels along the south sidewalk. These features limit the usable width of the sidewalks to approximately 6 feet each.
Significance:	The Water Street Bridge is historically and archaeologically significant for its example of late 19th century Baltimore through truss bridge construction, which is being phased out of existence. This bridge is also listed within the State of Connecticut's Historic American Engineering Record inventory of significant industrial and engineering sites.

Project Information:

This documentation was undertaken in June, 1986 in accordance with the Memorandum of Agreement by the Connecticut Department of Transportation as a mitigation measure prior to the replacement of the bridge.

By Agreement dated April 17, 1984, the Connecticut Department of Transportation retained Blauvelt Enginering Company to perform an in-depth inspection of the approximately 90 year old Bridge No. 334 carrying U.S. Route 1 (Water Street) over the tracks of the Metro-North Commuter Railroad in the City of New Haven; and to determine the need for the rehabilitation or replacement, in whole or in part, of the bridge such that it be capable of carrying HS-20 truck loading as defined by the American Association of State Highway and Transportation Officials (AASHTO).

Currently, U.S. Route 1 is detoured around the bridge due to its poor condition. The bridge was closed to traffic January, 1987.

The utility bridges on either side of Bridge No. 334 were excluded from the scope of work of this project.

The in-depth inspection was carried out on June 4 through June 26, 1984 by a team consisting of our personnel and staff provided by Butler & Evans, P.C., under sub-contract to Blauvelt Engineering Company. A topographic survey of the site was performed concurrently by VEP Associates, Inc. under sub-contract to Blauvelt.

Keith Hall
Transportation Planner
Bureau of Planning
Connecticut Department
of Transportation
Wethersfield, CT
May, 1987

I HISTORICAL INFORMATION

A. Physical History

According to the 1894 Report of the Connecticut Railroad Commissioners the most important and expensive change made on this division since the last report is the elimination of the Water Street crossing in the city of New Haven. Owing to its location at the entrance to the Water Street freight yard, it was probably crossed and obstructed more frequently by regular and switching trains than any other crossing in the State, which fact rendered its use for highway purposes extremely hazardous. An iron bridge of 157 1/2 feet span has been erected over the tracks for the accommodation of the large highway traffic, with inclined approaches from the adjacent streets, at an approximate cost of $50,000 for construction alone, not including damages to adjoining property" (1894:18). The bridge was part of the improvements being made by the New York, New Haven and Hartford on a railroad leased from the New Haven and Northampton Railroad, successors to the Farmington Canal Company.

In 1889 a law was passed giving the Railroad Commissioners authority to divide the cost of eliminating grade crossings among the parties concerned - the state, the town, and the railroad - and it is assumed that a procedure similar to this was followed for the Water Street bridge.

The bridge itself is a variation of a Pratt truss, one of the two standard metal truss bridges developed in the last half of the nineteenth century and much used in the twentieth century. Patented by Thomas and Caleb Pratt in 1844, the truss uses heavy vertical members in compression and lighter diagonals in tension. In the Water Street bridge the diagonals are eyebars rather than channel beams, and sub-ties have been added to the basic Pratt configuration. This particular modification of the Pratt truss was used extensively by the Baltimore and Ohio Railroad, hence the name Baltimore truss (Comp 1977).

Repairs were reportedly made to the bridge several times while it was under the control of the railroad but detailed records of such repairs were not found. Responsibility for the bridge passed from the New York, New Haven and Hartford to the Connecticut Bureau of Highways and then to the Connecticut Department of Transportation.

Obviously the wooden deck of the bridge was replaced several times since the original construction. In 1942 a new deck was installed, but only after a number of stringers were replaced and a concrete bridge seat poured in place on top of the masonry abutments. At some point the wooden deck was paved over but again, no records of when

this was first done were found. It is quite possible that it was in 1973 or shortly afterwards because the number of accidents on the bridge had risen to 36 in that year, and many of these were attributed to the slippery wooden deck. It was also at this time that the weight limits for the bridge were reduced to eight tons for a single unit and 15 tons for a tractor-trailer. In 1977 a fairly extensive rehabilitation of the bridge was undertaken, again with the replacement of a number of stringers as well as the deck. At that time a slurry seal of cationic emulsion asphalt was placed over the new wooden deck to provide a non-skid surface but, either because of the constant vibration or the thickness restriction imposed by the weight factor, that surface did not last and the bridge was soon back to the slippery wooden deck surface.

Constant deterioration of the metal parts was evident - in 1979 one of two eyebars supporting a panel cracked open and the other was cracked about half-way through. Had the second eyebar let go the panel would have dropped down on the 11,000 volt power cables and probably electrified the entire structure. At this point patch plates were welded on and cables and turnbuckles installed.

Bridge inspections in 1985 showed further deterioration and the load limit was lowered to three tons, effectively limiting traffic to passenger cars. In January 1987 the bridge was closed to all vehicular traffic.

B. History of the Crossing

The Water Street bridge in New Haven is over a crossing that is as old as New Haven itself. Long before there was a railroad or a railroad bridge, the crossing was important. In March 1638 a group of Reverend John Davenport's followers, who had wintered over in Boston, sailed into Quinnipiac harbor and up a small stream called West Creek. Although West Creek has now been totally filled in, the Wadsworth Map of 1748 shows this creek at the west end of Water Street, just before the small wharf that had been built there. The stream was still present on the Doolittle map of 1824 but bounded on the east by Union Street and on the west by Fleet Street (now State Street). The stream was a small one and none of the early maps, nor early histories, indicate any kind of bridge was ever built over it. Whether there was a bridge at the crossing or not, the area certainly was an important one in the history of New Haven. In 1784 Water Street was formally designated as "the street from Capt. Thomas Rice's to Ferry Point (Tomlinson's Bridge)". In 1771 a successful apothecary named Benedict Arnold moved from George Street to 157 Water Street, three houses up from the present bridge site, where he set up a shop and store.

After Arnold turned traitor in 1780 the house was adjudged to be forfeited and sold, with the money going to the state. Later Noah Webster lived in the house, which was eventually torn down around 1904.

One of the first mints was also located on Water Street near the crossing. Between 1786 and 1787 the so-called New Haven Mint struck a number of Connecticut copper cents. A number of well-to-do individuals lived in the area, including one Benjamin English who was killed in the British raid on New Haven in 1779.

When canal fever hit Connecticut in the early nineteenth century it was the New Haven merchants who were among its most active supporters. The first section of the canal was begun in 1825 and the immediate need for a southern terminus resulted in a decision by the Directors on May 6, 1826 that a "Basin be hereby established between the Long Wharf and Water Steet". This would serve as a transfer point for goods coming from or going to other coastal ports and also as a terminus for intrastate commerce. It was at this point that the sluggish little stream between Union and Fleet Streets was widened to accommodate the canal bed. Some 23 people, mostly along Water Street, received damages totaling $9107 for land taken for the Basin. This is apparently the first documented record of a bridge over the crossing, which was now a canal. The canal remained in operation from 1828 to 1847, but it was not very successful and was replaced by a railroad. When the canal bed was filled in and the railroad tracks were put down many of the bridges over the canal were removed, including the one over the Water Street crossing.

During the first half of the nineteenth century the Water Street area had become the heart of the New Haven business community, with a number of wholesale and retail merchants living along the street. During the last half of the century the elite residential area moved north to the Hillhouse Avenue area and many of the nicer Water Street residences were replaced by industrial and commercial buildings.

Between the filling in of the Farmington Canal basin in 1847 and the construction of the present steel truss bridge in 1894 the crossing at Water Street was evidently a grade crossing. Neither the 1879 New Haven pictorial nor the city real estate map of 1888 show a bridge at the crossing, although a steel truss bridge is pictured carrying Fair Street over the railroad one block north of the Water Street crossing. By this time the entire canal basin had been filled in and a locomotive roundhouse and repair yards built there. In 1894 much of the area was redesigned to raise Water Street from a ground crossing to an overpass and the present structure was installed over

eleven sets of tracks. Since then the bridge has been repaired and extensively renovated and the railroad lines have been electrified but the bridge is essentially the same as it was when installed.

C. Representation in Existing Surveys

The existing Water Street bridge is listed within the State of Connecticut Historic American Engineering Record Inventory of Engineering Sites.

D. Site Study

The Water Street bridge is located in a heavily commercialized district of south central New Haven, Connecticut. Among the civil and commercial facilities in the immediate vicinity are:

Yale University
Yale-New Haven Hospital
The New Haven Coliseum
The Knights of Columbus World Headquarters
The Brewery Street U.S. Post Office

All of these are accessible by the bridge.

E. Builder

As railroads merged and changed throughout the late 19th and early 20th centuries, many engineering records were misplaced leaving data, such as the actual contractor difficult to uncover. This is the case with this document as extensive research was unable to reveal the builder.

II CONSTRUCTION ENGINEERING

A. Description of Existing Bridge

This bridge carries U.S. Route 1 (Water Street), two sidewalks and three utility pipes over the tracks of the New Haven Division of the Metro-North Commuter Railroad in New Haven, Connecticut. These tracks also serve the mainline AMTRAK and Conrail lines between Washington, D.C. and Boston. There are 11 tracks including several switch points under the bridge. The bridge is approximately 0.25 miles north of the New Haven Union Station. Eight tracks lead into the station while three lead to sidings. All but one track adjacent to the east abutment of the bridge are electrified with power cables supported on catenary wires passing under and supported by the bridge. The bridge lies between the intersections of Union and Water Streets to the east, and State Street North and Water Street to the west (See Figure 1).

This bridge is comprised of a single 163 foot span structural steel Baltimore Truss superstructure supported on stone masonry abutments. These abutments are carried on concrete footings rounded on timber piles.

The superstructure is comprised of two pin-connected Baltimore Trusses from which are suspended riveted plate girder floorbeams. The trusses abut the 36± foot roadway and are contained within the 10± foot sidewalks which are cantilevered outside the trusses.

The usable width of sidewalk is further reduced by three pipe lines: a 20 inch low pressure gas line on the south sidewalk; one 20 inch water main and a 16 inch high pressure gas line on the north sidewalk, resulting in useable sidewalks of less than six feet on each side.

III SOURCES OF INFORMATION

A. Graphics

1. Map - Project location
   State of Connecticut Department of Transportation
   Figure 1 - Page 8

B. Bibliography

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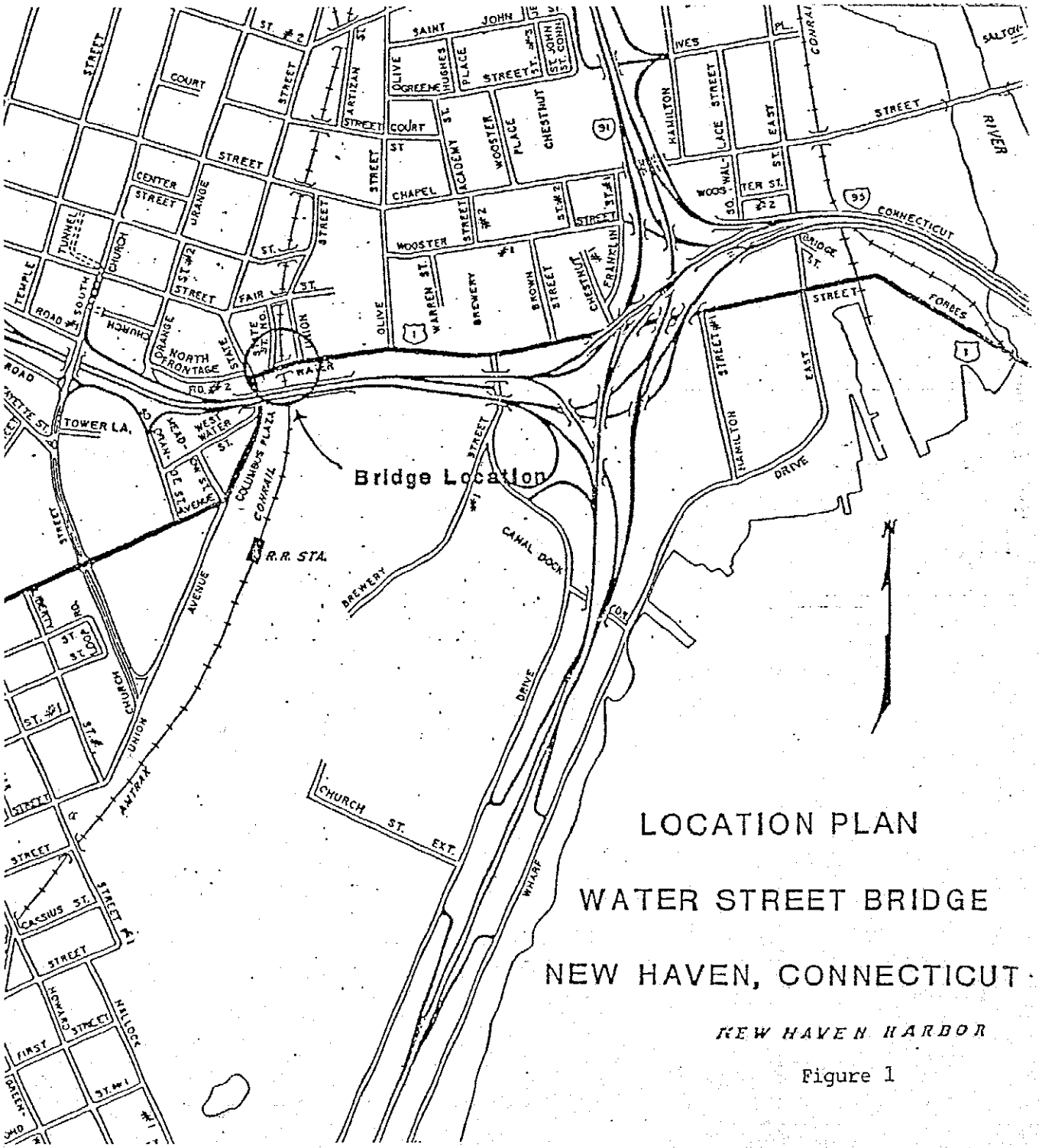

LOCATION PLAN

WATER STREET BRIDGE

NEW HAVEN, CONNECTICUT

NEW HAVEN HARBOR

Figure 1